

Maintenance, Monitoring, and Success Criteria for the Solana Hills Mitigation Site for the San Elijo Lagoon Nature Center Project

Prepared for

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1.0 Introduction

This report outlines the maintenance, monitoring, and success criteria for the off-site coastal sage scrub restoration, on the Solana Hills Mitigation Site (Solana Hills Site), for the San Elijo Lagoon Nature Center Project (project). The proposed project is located at the existing San Elijo Lagoon visitor center, which is located within the northwestern portion of San Elijo Lagoon County Park and Ecological Reserve (San Elijo Lagoon). The Solana Hills Site is located within the southernmost finger of San Elijo Lagoon, west of Interstate 5 and north of Lomas Santa Fe Drive, in the city of Solana Beach in northern San Diego County (Figure 1).

The goal of this project is to replace the existing visitor center, trailer, and storage shed (approximately 4,900 square feet) with a new, more efficient, two-story Nature Center (approximately 7,500 square feet). The new Nature Center will be constructed on a footprint similar to that of the existing visitor center. Potential impacts from construction include temporary impacts up to 0.149 acre and permanent impacts of up to 0.008 acre of coastal California gnatcatcher (*Polioptila californica californica*; CAGN) occupied coastal sage scrub habitat. Of the total impacts, 0.149 acre of temporary impacts and 0.011 acre (476 square feet) of permanent impacts will be mitigated on-site (RECON 2007a). The remaining 221 square feet of mitigation required for coastal sage scrub will be implemented off-site, at the Solana Hills Site. This maintenance, monitoring, and success criteria plan is to serve as an appendix to the Draft Solana Hills Coastal Sage Scrub Restoration Plan prepared by RECON (2007b).

2.0 Existing Conditions

The topography of the Solana Hills Site ranges from approximately 200 feet above mean sea level (MSL) at the southern edge to approximately 270 feet above MSL at the northern edge (Figure 2). The site is surrounded by residential development to the west and south with Interstate 5 to the east. San Elijo Lagoon extends north of the site. Soils within the site are terrace escarpments (TeF; U.S. Department of Agriculture 1973).

Diegan coastal sage scrub is the existing native plant community and the habitat to be restored on the Solana Hills Site.

2.1 Native Plant Community — Diegan Coastal Sage Scrub

Diegan coastal sage scrub is the southern form of coastal sage scrub. It occurs in areas with low moisture-availability, steep slopes, or xeric or clay rich soils (Holland 1986).

Figure 1; COLOR—8.5x11

Figure 2; COLOR—8.5x11

Sage scrub communities are dominated by lower-growing shrubs and subshrubs that are facultatively drought deciduous. Many of the shrubs and subshrubs in coastal sage scrub are three to six feet tall and have relatively open canopies. In addition, there is often a significant herbaceous understory, including native grasses and colorful native annual wildflowers.

Diegan coastal sage scrub exists throughout the site intermixed with large areas of ornamental vegetation and occasional patches of ruderal vegetation. Within the coastal sage scrub, flat-top buckwheat (*Eriogonum fasciculatum*) is the dominant species, along with broom baccharis (*Baccharis sarothroides*), California broom (*Lotus scoparius*), wart-stemmed ceanothus (*Ceanothus verrucosus*), California sagebrush (*Artemisia californica*), black sage (*Salvia mellifera*), Mojave yucca (*Yucca schidigera*), laurel sumac (*Malosma laurina*), and scattered lemonadeberry (*Rhus integrifolia*) and chamise (*Adenostoma fasciculatum*). Common herbaceous species also observed on this site include California everlasting (*Gnaphalium californicum*) and tarweed (*Deinandra fasciculata*).

2.2 Lands to be Restored

One area (a minimum of 221 square feet) near the north end of the Solana Hills Site will be restored to Diegan coastal sage scrub (Figure 3). The restoration area presently consists of ornamental vegetation, heavily dominated by iceplant (*Carpobrotus edulis*), and connects two existing stands of coastal sage scrub. A 20-foot weeding buffer will also be maintained surrounding the restoration area.

3.0 Responsible Parties

3.1 County of San Diego

The entity undertaking the restoration must make a good faith effort to meet success criteria. The responsibilities are itemized below:

- Fund the maintenance and monitoring of the habitat restoration on the property as outlined in this plan.
- Hire qualified entities for the tasks described in this plan to install and maintain the project, or have the restoration biologist subcontract them.
- Administer contracts for implementing the plan.

Figure 3; COLOR—8.5x11

- Decide to stop work, suspend payment, or terminate contracts for inadequate performance. This includes all phases of project installation, long-term maintenance, and biological monitoring. The restoration entity may replace any of these providers if necessary.
- Pay for plants, seeds, and other materials needed for restoring the habitat.

3.2 Restoration Biologist

The restoration biologist must have a minimum of two years of experience in upland habitat restoration. The restoration biologist must understand upland plant communities and have expertise in upland plant and wildlife identification and ecology. The restoration biologist will be retained during habitat restoration to perform the following tasks and be responsible for implementing the restoration plan in accordance with its specifications:

- Oversee maintenance of the habitat restoration area as defined herein.
- Oversee and perform the required monitoring and reporting in accordance with the procedures established in this plan.

4.0 Reference Site for Monitoring

In conjunction with annual quantitative monitoring of the restoration site (see Section 7.0, Monitoring Methods), the restoration biologist will assess vegetation within the mature coastal sage scrub community which exists on-site to serve as a qualitative reference. Conditions including the degree of weed invasion and presence of annual species will be evaluated to aid in determining maintenance needed within the restoration site such as weeding, replanting, and reseeded.

5.0 As-Built Plan

This restoration project will require an as-built plan to be prepared and submitted to the County of San Diego. The as-built plan covers the time period from when implementation of restoration begins to the end of the main planting activities.

The as-built plan will document activities related to site preparation, container planting, and seeding throughout implementation of restoration. The restoration biologist will be responsible for keeping dated records of the activities listed above, as well as any significant problems encountered or necessary changes made in the field. The as-built plan will include photographs of the restoration activities and the site after it is planted and seeded. The as-built plan will be submitted to the County of San Diego within 30 days of completion of implementation activities.

6.0 Maintenance

The maintenance period will follow seeding and planting, and will last for five years or until success criteria are achieved (Table 1). In the instance of catastrophic events (i.e., fire or flood) however, maintenance shall not extend beyond the original term of five years. The maintenance program will include weed control, debris removal, replanting, and reseeding, as well as other tasks as required for the site to grow and achieve the success criteria established in this plan. Maintenance measures will be conducted by maintenance personnel who are experienced in caring for native plant communities.

TABLE 1
APPROXIMATE MAINTENANCE SCHEDULE

Type/Task	Year 1	Year 2	Year 3	Year 4	Year 5
Weed control	As-needed up to five times	As-needed up to four times	As-needed up to four times	As-needed up to four times	As-needed up to four times
Trash removal	Monthly	Quarterly	Quarterly	Quarterly	Quarterly
Replanting/seeding	Winter	Winter	Winter	—	—
Irrigation	As-needed	As-needed	Remove	—	—

6.1 Weed Control

Weed control will continue throughout the monitoring period within the restoration area and the 20-foot weeding buffer. Exotic species will be removed by hand, mechanical weed cutters, or herbicide applications (as recommended by a Qualified Applicator) by maintenance workers familiar with and trained to distinguish weeds from native species. During the first year, weeding will be performed as needed up to five times to keep weeds from producing seeds and to control weed competition during the establishment period of native plants. Weeding will continue four times per year thereafter. Weeds will be killed or removed before they set seeds. Appropriate weed control measures will be implemented under the direction of the restoration biologist. A list of exotic species anticipated to grow on the site is presented in Table 2, with iceplant as the dominant occurring species. In the event that additional invasive plant species are encountered, the restoration biologist will refine measures to control them.

TABLE 2
ANTICIPATED EXOTIC PLANT SPECIES THAT MAY NEED TO BE CONTROLLED

Scientific Name	Common Name
<i>Atriplex semibaccata</i>	Australian saltbush
<i>Avena</i> spp.	Wild oats
<i>Brassica</i> spp.	Mustard
<i>Carpobrotus edulis</i>	Hottentot fig, Iceplant
<i>Centaurea melitensis</i>	Tocalote
<i>Crassula argentea</i>	Jade plant
<i>Erodium</i> spp.	Filaree, storksbill
<i>Eucalyptus</i> spp.	Eucalyptus
<i>Foeniculum vulgare</i>	Fennel
<i>Hypochaeris glabra</i>	Smooth cat's-ear
<i>Nicotiana glauca</i>	Tree tobacco
<i>Ricinus communis</i>	Castor bean
<i>Salsola tragus</i>	Russian thistle
<i>Schinus molle</i>	Peruvian pepper

6.2 Vegetation Clearing and Trash Removal

Pruning of any native vegetation or removal of deadwood and leaf litter shall not be allowed in the restoration area. Trash will be removed from the site by hand on a monthly basis, or as necessary, for the duration of the first year and quarterly thereafter. Within the context of restoration, trash consists of all man-made materials, equipment, or debris left within the restoration area that is not serving a function related to revegetation.

6.3 Replacement Plantings and Reseeding

The habitat quality of the restoration site is expected to improve each year of the maintenance and monitoring period. The restoration site will be replanted and/or reseeded with appropriate species or species that did not produce adequate seed during the implementation year, if necessary. This process will be repeated every year as needed to increase species diversity and cover to be comparable to the reference site, and to improve long-term plant community stability. Additional seeds will be hand broadcast early in the rainy season (October to December). Plants which may have died will be replaced with appropriate container sized plants and slow-growing species that were not prepared in time for the initial planting will be planted from containers.

6.4 Irrigation

Irrigation will be applied as needed (as determined by the restoration biologist) for the first two maintenance and monitoring years. An irrigation system will not be used. Supplemental water will be provided from a water truck and hose. At the direction of the restoration biologist, supplemental irrigation will be discontinued when the plants have become established.

7.0 Monitoring Methods

The monitoring period will begin with implementation of the restoration work and will last for five years or until the restored vegetation has met success criteria. A monitoring schedule is presented in Table 3. The monitoring program will be conducted by the restoration biologist as outlined below.

TABLE 3
MONITORING SCHEDULE (APPROXIMATE)

Type/Task	Year 1	Year 2	Year 3	Year 4	Year 5
<u>Qualitative</u>					
Monitoring	Weekly/ Monthly	Monthly	Quarterly	Quarterly	Quarterly
<u>Quantitative</u>					
Spring vegetation counts	—	Annually	Annually	Annually	Annually

7.1 Qualitative Monitoring

Evaluation of plant health and identifying and correcting problems as they arise are necessary for ensuring successful vegetation establishment. Qualitative monitoring will be conducted weekly for the first two months following the construction year and monthly for the remainder of the first year. Qualitative monitoring will occur monthly for the second year and quarterly for the remainder of the maintenance and monitoring period. Qualitative monitoring involves the restoration biologist's reviewing the revegetation area to examine transplanted container plant vigor, native annual and grass germination, and exotic plant encroachment and control.

7.2 Quantitative Monitoring

Quantitative monitoring will be performed to measure development of vegetation in the restoration area and to document that the restoration area achieves the success criteria as defined by the performance standards.

Beginning in Year 2, total vegetation counts will be performed and total invasive weed cover will be calculated within the restoration site to measure year-to-year changes in plant survival and species diversity. Counts will be conducted in the spring so that the maximum species diversity will be recorded. Photographs will be taken from three permanent photopoints each time the site is monitored to record the progress of mitigation over the monitoring period.

8.0 Monitoring Reports

Annual reports summarizing monitoring results of the Solana Hills Site restoration project will be submitted to the County of San Diego per permit conditions by the restoration biologist within one month of the end of the monitoring year. The quantitative

monitoring section will include survey methods, data summary analysis, comparison to performance standards, discussion, reporting remedial actions, recommendations, and photodocumentation. Each annual report will compare findings of the current year with those in previous years. The annual monitoring reports will then be submitted by the County to the US Fish and Wildlife Service (USFWS) and California Department of Fish and Game (CDFG).

9.0 Performance Standards

Coastal sage scrub restoration on the Solana Hills Site will be considered successful when the performance standards have been met. The habitat must sustain itself for a minimum of two years in the absence of significant maintenance measures after the third year of monitoring. Significant maintenance measures include replanting or seeding, eradication of major weed infestations, and erosion repairs. Other maintenance measures (such as weed control in small areas) may continue until the end of the monitoring period. The performance standards described below, percent survival and weed cover, will be measured as absolute values.

9.1 Plant Community Development

The restoration area will show a developing trend of vegetation cover and diversity that is similar to the reference area habitat. During the quantitative monitoring, percent container plant survival and percent weed cover will be taken as absolute measures. The number of surviving plants will be counted and compared to the original number planted. Container plant survival shall be 100 percent at the end of three years and at the end of the monitoring period (Table 4).

If the goals listed above are not met, the restoration biologist will determine if remedial actions are necessary on the portions of the restoration site that do not meet the three-year success goals.

TABLE 4
FIVE-YEAR PERFORMANCE STANDARDS

Year	Container Plant Survival	Maximum Percent Weed Cover
1	90	10
2	100	10
3	100	10
4	100	10
5	100	10

9.2 Tolerance of Weeds

The cover tolerance of weeds and non-native annual grasses, as identified by the restoration biologist, will be no more than 10 percent (see Table 4) in the restoration site

and weed buffer area. The tolerance of perennial species such as giant reed and pampas grass will be 0 percent throughout the five-year maintenance and monitoring period.

9.3 Maintenance Measures

The restoration site will not have required significant maintenance measures (replanting, eradication of major weed infestations, and erosion repairs) during the last two years of the monitoring period, as certified by the restoration biologist.

10.0 Remedial Actions

If restoration on the Solana Hills Site does not meet the standards established above, the restoration biologist will develop remedial measures, probably to include reseedling or replanting certain areas. After remedial measures have been implemented, maintenance and monitoring shall be according to the steps in this plan until the restoration site meets the performance standards.

11.0 Notification of Completion

Upon satisfactory achievement of the performance standards for the Solana Hills Site restoration area, the restoration biologist shall notify the County of San Diego. In addition, a site review will be scheduled with representatives from USFWS and CDFG to review the restored area.

12.0 References Cited

Holland, R. F.

- 1986 Preliminary Descriptions of the Terrestrial Natural Communities of California. Nongame-Heritage Program, California Department of Fish and Game. October.

RECON

- 2007a Maintenance, Monitoring, and Success Criteria for the San Elijo Lagoon Nature Center Project On-site Planting Plan. RECON Number 4440B. February 13.
- 2007b Solana Hills Site Coastal Sage Scrub Restoration Plan. RECON Number 4440B. February.

Sawyer, J. O., and T. Keeler-Wolf

- 1995 A Manual of California Vegetation. California Native Plant Society, Sacramento.

U.S. Department of Agriculture

- 1973 Soil Survey, San Diego Area, California. Soil Conservation Service and Forest Service. Roy H. Bowman, ed. San Diego. December.

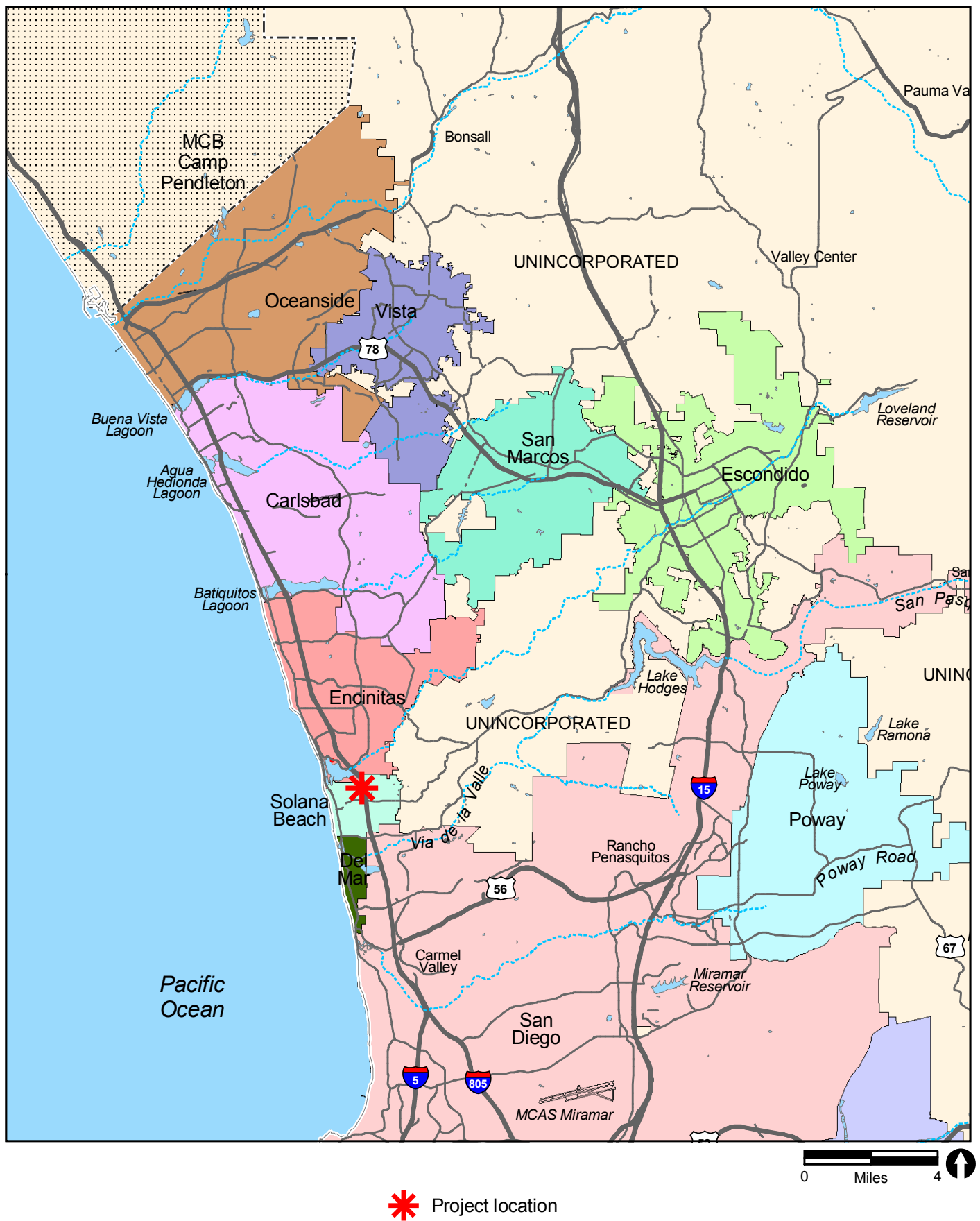
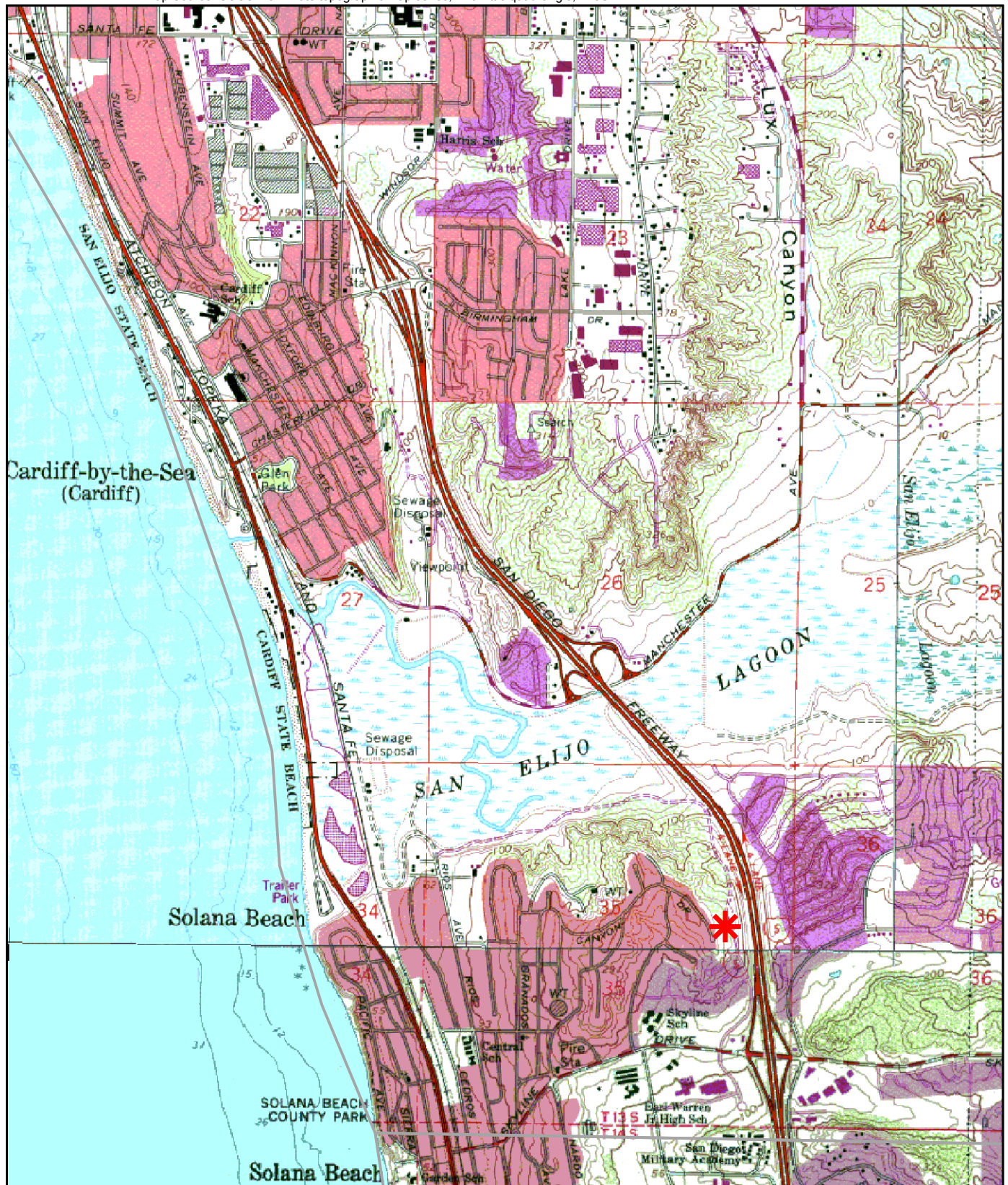


FIGURE 1

Regional Location of the Solana Hills Site
for the San Elijo Lagoon Nature Center Project



 Project location

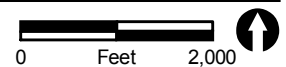


FIGURE 2

Solana Hills Site Location on USGS Map



- | | |
|--|---|
|  Project Boundary |  Coastal Sage Scrub Restoration Area |
|  Existing Parcels |  Diegan Coastal Sage Scrub |
|  Weeding Buffer |  Ornamental Vegetation |



FIGURE 3

Solana Hills Site Coastal Sage Scrub Restoration Overview